



From the SelectedWorks of Josep M. Colomer

January 2012

Equilibrium Institutions: The Federal-Proportional Trade Off

Contact
Author

Start Your Own
SelectedWorks

Notify Me
of New Work

Available at: http://works.bepress.com/josep_colomer/43

Public Choice (2012, forthcoming)

Equilibrium Institutions: The Federal-Proportional Trade-Off

JOSEP M. COLOMER

Institute for Economic Analysis, CSIC, Barcelona,
and Georgetown University, Washington, DC
(E-mail: josep.colomer@gmail.com)

Abstract

Durable democracies display a huge variety of combinations of basic institutional formulas. A quantitative logical model shows that while there are multiple equilibrium sets of institutions, each involves some trade-off between the size of the country, the territorial structure of government and the electoral system. Specifically, the larger the country, the more important is federalism in comparison to proportional representation electoral rules for the durability of democratic institutions. The explanatory power of the model is positively tested on all current durable democratic countries. It is also illustrated with a few both fitting and deviant cases. A relevant implication is that the room for manipulation of the choice of institutions is large, but not unlimited, as the choices for a durable democracy are constrained by bounded trade-offs between the values of major institutional variables.

Acknowledgments

Previous versions of this paper were presented at the annual meetings of the American Political Science Association in Washington, DC, in 2010, and of the Public Choice Society in San Antonio, TX, in 2011. I acknowledge dedicated research assistance by Joan Ricart-Huguet and insightful comments and suggestions by Roger Congleton, Jose Fernandez-Albertos, William Keech and Iain McLean.

1. Introduction

Democratic regimes display a huge variety of combinations of some basic institutional formulas. This paper presents an explanatory quantitative model of this variety. The analysis shows that there are multiple equilibrium sets of institutions, each involving some trade-off between the size of the country, the territorial structure of government and the electoral system. The choices of institutions for a durable democracy permit ample room for manipulation, but they are constrained by bounded trade-offs between the values of major institutional variables.

William Riker famously stated that politics is a dismal science because “there are no equilibria to predict” (Riker 1980: 443; 1982). This statement has been disputed by some political scientists that emphasize the role of political institutions in inducing policy stability and producing “structurally-induced equilibria” (Shepsle 1979, 1986, 1989). This response obviously implies that institutions are relatively more stable than policy tastes and politicians’ maneuvers. In a rather extreme version, institutions would tend to reinforce themselves and produce long-term durable “equilibrium institutions”, even if some of them can produce socially inefficient outcomes, due to the actors’ adaption to regularities and the cost of their replacement (North and Thomas 1973; North 1990; Pierson 2000). For Riker, in contrast, “rules or institutions are just more alternatives in the policy space, and the status-quo of one set of rules can be supplanted with another set of rules” (Riker 1980: 22). However, he somehow acknowledged that institutions tend to be relatively more stable than other policies, although the difference would be “in degree, not kind”. (For discussion, see Colomer 2001a; more extensive analysis in Colomer 2001b.)

In further exploration, Riker wondered, nevertheless, “about the reasons for stability and longevity” for constitutions and, more particularly, for certain institutional formulas, namely federalism. One of his main findings is “a close association between stability and longevity [of federations], on the one hand, and a large number of constituent units... on the other hand” (Riker 1987: 111-112). He gave a rationale for this association as usually based on incentives for actors’ strategies: “A large number of similar constituent units may both remove the possibility that one overweening unit desert or conquer the rest and simultaneously discourage small units from abandoning the protection of a large federation” (*ibid*). In short: stable federations usually have a large number of constituent units while unstable ones do not. (See also Riker 1996).

This article draws on Riker’s important finding but places the stability of federal institutions in a broader institutional context, basically including the size of the country and the electoral system. A logical model is presented with quantitative measurements of the institutional variables and their relationships. The explanatory power of the model is positively tested on all current durable democratic countries. It is also illustrated with a few significant fitting cases and discussion of some deviant cases, which, in the light of this analysis, are likely candidates for either democratic failure or major institutional reforms.

2. Comparing institutional combinations

That both federalism and proportional representation electoral rules can favor institutional stability is not a completely new idea. It has been usually presumed that in large and heterogeneous countries federalism and proportional representation can work along about the same direction in order to facilitate good governance. A large number of territorial political units in a federal structure can be the basis for a large, aggregative ‘union’, while a large assembly based on proportional representation and multipartism can also be aggregative because it can lead to the formation of some broad government multiparty ‘coalition’. Both ‘union’ and ‘coalition’ can keep a large and varied country together by using democratic means of governance. For the same kind of reason, simple institutional configurations such as a unitary state and plurality rule elections with a single-party winner can support durable democracy in small and homogeneous polities, but they tend to be recipes for conflict and democratic failure in large and heterogeneous countries.

However, not much specific attention has been paid to the relations between institutional formulas for the territorial structure of government and for elections. A few words in works on related subjects include, for instance, the following comments: “A federal system with a first-past-the-post or simple plurality vote within each single-member constituency seems to be peculiarly well adapted to the United States, but it would kill democracy in heterogeneous societies” needing proportional representation (Balinski and Young 1982: 87); both federalism and proportional representation “represent complementary institutional mechanisms for the accommodation of deep societal divisions” (Lijphart 1999: 253; emphasis added); “the degree of proportionality in the electoral system will depend in part on the use of alternative mechanisms, such as federalism, to manage conflict and fulfill the goal of fair political representation” (Boix 1999: 622; emphasis added); “in a democracy, political conflicts inside a parliament between representatives of different territorial units are best solved by federalism... [while] political parties form along the left-right axis and not along territorial lines” (Hix et al. 2007: 4).

From these and similar comments it could be inferred that federalism and proportional representation are institutional devices able to be exchanged with each other to some extent. Territorial governments could be considered as kinds of intermediate, aggregative, non-ideological “parties”, while political parties may play the role of aggregative, non-territorial “administrations”.

Yet in a democratic regime, different institutional formulas may produce effects that cannot be exchangeable. As we will see, different combinations of unitary or federal arrangements with majority or proportional electoral formulas can be appropriate for countries of different sizes. For each country size there can be multiple equilibrium sets of democratic institutions, but each involving a certain trade-off between alternative formulas. Specifically, the larger the country, the more important is federalism in comparison to proportional representation for the durability of democratic institutions. Note that I am not postulating the existence of multiple sets of equilibrium institutions, but of multiple equilibrium sets of institutions. Indeed every institutional

variable can be manipulable, but in order to produce a durable –“long-lived” in Riker’s terms—democratic regime, its variance must be bounded by the values of the other relevant institutional variables in order to produce an equilibrium set.

In the following I consider that an explanatory and predictive model of successes and failures regarding the duration of different institutional regimes should include not only the sign of presumed associations between different alternatives, but gradations of effects. This can be supported by quantitative measurements of the main variables considered. A quantitative model can define relationships and trade-offs among variables in terms of “how much” one can depend on another and the expected variance of values.

With this methodological orientation this article follows the project of building theoretically inspired models based on logical grounds that can be empirically tested and used for predictions within acceptable margins of error (as developed, in particular, by Rein Taagepera 2008). It is here generally assumed that the outcomes of human interactions --including, as in the topic addressed here, the choice of institutions-- can produce regularities amenable to being captured by mathematical formulas expressing relationships between well-defined variables.

Recent discussion has identified a few more specific traits that this kind of model should fulfill, as I will try to do in the present article: First, a simple and relevant equation should include a small number of well-defined variables; second, parameters and coefficients should be measured; third, a mathematical equation should be based on reasonable hypotheses about the relationship among variables, which usually requires assumptions regarding actors’ motives and choices; it may have a non-linear form, but include multiplication, division, power or derivative (or have an additive linear format for the logarithms of the variables); fourth, the directionality of the relationship should be specified. (See discussion in Taagepera, Coleman, Colomer and Grofman 2007.)

Relative remote precedents of this approach can be found, for instance, in mathematical studies of the causes and origins of arm races and wars (Richardson 1949) or of the conditions for optimal decentralization (Kochen and Deutsch 1969). Some more recent contributions have dealt with the relationships between country’s population and assembly size (Taagepera and Shugart 1989), assembly size, electoral district magnitude and number of parties (complemented with calculations for the largest party size and cabinet durability, Taagepera 2007), and number of parties and degree of policy change (Colomer 2012), among other related subjects. As several of these contributions are producing cumulative and complementary findings, this approach can contribute to a better understanding of the choice of political institutions and several successive stages of the political process.

3. The Model

Let’s start by comparing the population size of democratic countries with different institutional combinations. For the purposes of this exercise, countries are considered to be democratic if they are classified as ‘free’ in the Freedom House annual reports during

the period from 2000 to 2010 (that is, with a score lower than 3 on a scale from 1 to 7, Freedom House 2011). This produces a list of 82 ‘democratic’ and 110 ‘non-democratic’ countries (including in the latter category both those whose scores correspond to the categories of ‘partly free’ and ‘not free’ in the aforementioned reports). A long-term measurement is appropriate for this analysis since we do not aim at picturing the map of the world at any specific moment, but to estimate the durability of certain institutional formulas. Further on in this paper, we will consider possible differences in institutional stability among countries that established their democratic regimes in different historical periods.¹

The basic institutional alternatives are operationalized with simple quantitative variables. Federalism, taken in a broad sense as equivalent to political decentralization, can be measured by the number of elected territorial assemblies with political powers (excluding merely administrative units such as local governments) within the country. The values of R (for ‘regions’) vary from 1 in unitary countries, even if they are very large, such as for instance Japan, to 50 in the federal United States. For federal countries the values of R can capture the degree of decentralization of each country as a whole in a continuum of values. (By adopting this continuum measurement, I depart from Riker, who used only a trichotomous classification of countries for sets of numbers of territorial units.)

Note, for instance, that according to this measure, the United Kingdom, with R=4 (Scotland, Wales, Northern Ireland, and “the rest”), is valued more than six times lower in federalism than Switzerland, with R=26, in spite of the former having a population eight times larger than the latter. Likewise, Spain with R=17, is valued almost six times higher in federalism than Portugal, with R=3, in spite of the former having a population only about four times larger than the latter. This measure can also capture the well-established Rikerian observation that federations with only two or three units (and thus, with low values of R), which usually implies that one unit can encompass an absolute majority of the population, foster polarization and conflict and tend to fail, while successful federations usually have high numbers of units (and thus high values of R).

In turn, the electoral system for the country-wide lower chamber is measured by the number of seats or magnitude of the average electoral district, or M (for ‘magnitude’). The choice of this quantitative variable is in accordance with the cumulative literature on the importance of the different elements of electoral systems (from Duverger to Rae, Lijphart, Cox, Taagepera, among others, see discussion in Colomer 2005). For the present exercise, the average value of M in mixed electoral systems has been weighted by the numbers of seats elected in districts with different values of M (according to the suggestion by Gary Cox 1997: 208-9).

¹ A ten-year period may serve as a proxy for longer periods because the fall of democratic regimes having lasted for more than a decade are rare, in spite of the high number of democratic breakdowns that have been registered in the last 100 years. Exceptions include Lebanon, the Philippines, Sri Lanka and Venezuela, none of which are included in the set of countries under examination in this paper. Polity IV gives data with a very high correlation with those used in this paper. See polity IV Project (2009).

The size of countries with multiple territorial units ($R > 1$) is 22 times larger in average than the size of those with a unitary structure ($R = 1$), as is clearly confirmed by Tables 1 and 2. However, the order is not consistent when the countries are also classified according to the variable M and combinations of the two institutional variables. This produces the following four categories: 1) $R > 1$, $M > 1$ (countries with multiple territorial units and multi-seat districts with proportional representation rules); 2) $R > 1$, $M = 1$ (countries with multiple territorial units and single-seat districts with plurality or majority rule); 3) $R = 1$, $M > 1$ (unitary countries with proportional representation); and 4) $R = 1$, $M = 1$ (unitary countries with single-seat districts). It could be expected that the size of stable democratic countries would correspond to the order in which these four categories are listed here, from higher to lower levels of institutional pluralism.

As can be seen in Table 3, the differences in population means between the first and second categories taken together, the third and the fourth clearly fulfill the expected order, but the differences between the first and the second categories if taken separately are small and run in the opposite direction. The groups of democratic countries in the first two categories, that is, those with $R > 1$, implying some degree of decentralized or federal structure, have mean and median population sizes that do not correspond to the degree of political pluralism that can be associated with their electoral systems. Specifically, the federal countries with $R > 1$ and proportional elections with $M > 1$ are of smaller mean and median sizes than those in the second category with $R > 1$ and single-member electoral districts $M = 1$. A durable democracy in large countries turns to be generally associated with federalism, as expected, but the electoral system does not seem to have been adopted in some of these countries on the basis of the country's size.

Finally, the democratic countries in the third and fourth categories are all unitary and of smaller size than the previous ones. Within these countries with a unitary structure, those with $M > 1$ and proportional representation electoral rules have larger population sizes than those with single-seat districts $M = 1$ (about 18 times larger), in this instance confirming the expected result.

These preliminary observations permit us to formulate the hypothesis that some trade-off between alternative formulas for different institutions –for territorial organization and the electoral system-- indeed exists, but it is neither symmetric nor equally effective in countries with different sizes. It can be hypothesized that in large countries federalism can be more effective for good governance and durable democracy than any variant of electoral rules. In medium-sized countries, territorial governments may be less effective, possibly because even if the different groups of the population can be globally varied in economic or cultural terms they are likely to be more mixed in the territory, thus making proportional representation and multipartism more helpful.

Table 1. Population of countries with federal or unitary structure

Number of regions	Population mean	Population median	No. of countries	Percentage of world population
R>1	119,605,188	46,063,500	19	16.46
R=1	6,998,202	2,083,500	63	83.54

Table 2. Population of countries with proportional or single-seat electoral rules

Electoral magnitude	Population mean	Population median	No. of countries	Percentage of world population
M>1	17,487,132	5,057,655	59	38.57
M=1	72,658,937	344,000	23	61.43

Table 3. Population of countries with ‘regions’ and electoral ‘magnitudes’

Institutional regimes	Population mean	Population median	No. of countries	Percentage of world population
R>1, M>1	49,707,120	39,745,613	13	23.75
R>1, M=1	271,051,002	62,829,570	6	59.78
R=1, M>1	8,575,221	3,433,450	46	14.82
R=1, M=1	2,638,208	188,540	17	1.65

For the country size, I choose an institutional variable with a range of values and distribution comparable to the two variables, R and M, previously mentioned, that is the size of the representative assembly or total number of seats of the single or lower chamber, which can be notated as S (of ‘size’). For most countries there exists a positive correlation between the assembly size and the cube root of the population (Taagepera and Shugart 1989: 173-183). This permits one to make inferences about different equilibrium institutions in countries of different sizes. But S has some variance of values and thus a certain range of choices, which can contribute to establishing equilibrium relationships with the other institutional variables.

Certainly, other institutional variables could be taken into consideration, such as bicameralism and separate presidential elections. However, the upper chamber, when it exists, is in most democratic countries part of the federal design of the country and,

thus, somehow implicitly taken into consideration with the federal variable. The relations between presidents and assemblies, which involve a gradation of relative powers, checks and balances, should be the subject of further exploration and research (For an early attempt to measure separate institutional powers with quantitative values, see Shugart and Carey 1992).

The ranges of values of the chosen variables for the 82 current durable democracies identified in the previous section are as follows:

$$1 \leq R, M \leq S \leq 659$$

Since the values of the three variables, R, M and S, are positive and their distributions are not normal, but rather they have large standard deviations, I use log values.² Running the standard linear additive regression for the log values of these three basic institutional variables, we find a highly significant relationship between them. The model accounts for almost half (48%) of the variation of the assembly size in durable democratic countries, as shown in Table 4.

$$\ln S = 4.11 + 0.52 \ln R + 0.26 \ln M \quad (1)$$

Table 4. Assembly size, regions and magnitude, regression

Variables	Range	Mean	Median	Coefficients	Standard error
Size S	14-659	170.89	101		
Regions R	1-50	4.73	1	0.256	(0.048)
Magnitude M	1-598	25.83	6.57	0.519	(0.057)
Constant				4.112	(0.204)
Robust R ²				0.476	
p-value				0.000	

Data sources: Inter-Parliamentary Union-Parline Database (2009), IFES' Election Guide (2009) and ACE Project (2009), The World Factbook (2009) and country sources.

The placement of S in the function as the 'dependent variable' should not be confusing. Actually the model can accept bidirectional lines of causality, as all variables are to some extent interdependent, rather than independent or dependent. On the one hand, the choices of institutional alternatives for territorial structure and the electoral system, R and M, can be in equilibrium in a country of a certain size if the subsequent choice of S, although it keeps within the limits of significance in relation to the country

² The standard deviation exceeds the mean slightly in the distribution of S values, two times in the distribution of R values, and three times in the distribution of M values. In order to always work with positive log values, since R and M have minimum values at 1, whose logarithm is 0, one unit is added to the values of the variables, so that $\ln R+1 = 1$ when $R=1$, and $\ln M+1=1$ when $M=1$.

population, takes the appropriate value to accommodate those choices. In the opposite direction, S can just reflect the size of the country and lead to the choice of matching territorial and electoral institutions. As all the variables are manipulable, multiple equilibria can result from trade-offs between institutions.

Generally, the choices of institutions can derive from strategic calculations by self-interested political actors in different dynamic processes. If the resulting institutional choices are attuned to the size and structural characteristics of the country, they may obtain endogenous support and endure. Specifically, if in a large country multiple territorial governments are established, much political action will focus on those local institutions and it will be less likely that multiple political parties will be formed at the country-wide level, and as a consequence there will be less pressure to adopt a large assembly and an electoral system of proportional representation (the United States, for instance, would be a case in point). In contrast, in a medium-sized country with a unitary territorial structure but with a variety of economic interests or cultural allegiances, the formation of multiple political parties may push for a sufficiently inclusive assembly elected by proportional electoral rules, rather than for territorial governments (like, say, in the Netherlands). The relationships between institutional variables are always established through the intermediation of collective action.

A crucial point to exploit the analytical potential of this model is to take the coefficients seriously. Since all values of the variables are positive, we can build a model of a multiplicative format by shifting from (1) to antilogarithms (and rounding coefficients just a little):

$$S = 62 * R^{1/2} * M^{1/4} \quad (2a)$$

which can also be written as:

$$S = 62 \sqrt{R \sqrt{M}} \quad (2b)$$

where:

S: Size or total number of seats of the country's assembly, which is a proxy for the size of the country in terms of population.

R: Number of territorial units or regions with elected assembly and political power, which is a proxy for decentralization and federalism.

M: Magnitude or number of seats in the average electoral district, which is a measure of the inclusiveness of the electoral system and a proxy for multipartism.

We can interpret this equation the following way. First, the positive and multiplicative relationship between R and M indicates that both territorial governments and proportional representation are associated with durable institutional regimes in large countries, as expected. This is confirmed by the positive and significant relationships of each of the two variables with S if taken separately (for S and R, $R^2 = 0.34$, p-value = 0.000; for S and M, $R^2 = 0.16$, p-value = 0.000).

Second, there is no overlap between R and M. This confirms that “federalism is compatible with a variety of electoral rules at both national and territorial levels” (as stated in the survey by Weaver 2002: 115). In other words, both territorial governments and proportional elections can help make a country governable in democracy as the size of the country increases, but their effects are pretty independent from each other. As we can also test now with the operationalized quantitative values of the two variables, the correlation between R and M is almost inexistent ($R = 0.008$, $p\text{-value} = 0.43$).

Third, the exponential form of the function (2b) implies that the impact of increases in the values of R and M diminishes the higher are these values. The double power for R than for M indicates that the positive effect of a large number of territorial units or ‘regions’ is higher than the effect of a large electoral district ‘magnitude’. Due to the exponential form the difference in effects between R and M increases with the size of the country. For small countries with low values of S, the variables R and M can take similar values (at the limit, $R = M = 1$). In medium-size countries, multiple combinations of moderate values of R and M –some territorial decentralization and proportional elections-- can work. But the larger the country, the more important the increases in the values of R become in comparison with increases in M to account for the stability of institutions in enduring democracies.³

This result, therefore, supports the hypothesis that the larger the country, the more effective and durable federalism can be, to the point of being compatible with very diverse electoral systems for the lower chamber. The results given by equation (2b) for some specific countries will be reviewed as an illustration of the analytical and predictive potential of the model. Before that, let’s discuss possible supplementary elements.

4. Extensions

As an exploration of other possible relevant features and how they can be related to one another, a number of additional variables have been added to the statistical analysis just reported. They basically refer to the economic and cultural heterogeneity of the population, colonial legacy, and the period in which democracy was initiated.

Population heterogeneity. A country’s economic and cultural heterogeneity might be considered a relevant factor to explain governance problems and the appropriateness of complex institutional design. This hypothesis can be based, for example, on the fact that “every single longstanding democracy in a multilingual and multinational polity is a federal state” (Stepan 1999: 19). However, the statistical analysis with the available data is inconclusive and does not permit us to improve the function by modifying the

³ The difference between the weights of R and M in the equation is not dependent on the difference between their ranges of values, since it holds also for the mean values of the two variables; for the countries with $R > 1$ the mean value of $R = 16$ and for the countries with $M > 1$ the mean value of $M = 35$, thus $R^{1/2} = 4 > M^{1/4} = 2.4$.

assumption that country size is a sufficiently good proxy for governance costs, as shown in Table 5.

Specifically, for economic variety of the country, two variables have been considered. The first is the proportion of the active population of the country employed in agriculture as a measure of diversification of the economic activity of the population (as was already used, for instance, by Powell 1982). But it turns out to be irrelevant for the issue under discussion.

The second variable related to economic variety is the proportion of a country's foreign trade out of its GDP, which may indicate some degree of differentiated interested between inward- and outward-oriented sectors of the population. As should be expected, it appears negatively correlated with the measures of size, the country's population (Pop) and the country's area (A), as well as the assembly size or S. Foreign trade is also negatively and significantly correlated with the measure R for federalism (but not with M for the electoral system). This is an interesting finding, but it may not improve our institutional analysis. It basically means that the more decentralized the country the lower its proportion of foreign trade, but this can be due precisely to the fact that within a large federal country there is extensive 'domestic' trade among people and firms located in its different internal territorial units, whereas people and firms located in a small unitary country can develop similar amounts of trade with partners located at similar distances, but across borders, which counts as 'foreign'. It is therefore the institutional structure, whether a large federation or a small independent country, that may make the counting of long-distance trade different, not the trade that can explain institutional choices.

For cultural heterogeneity I choose the fractionalization index calculated by Alesina et al. (2003), which is a combination of race and language characteristics of the population. None of the correlations of this index with the measures of size, S, Pop and A, or with the institutional measures of federalism, R, and the electoral system, M, appear to be statistically significant. I also calculated correlations with alternative indices, the language and the religion index in Alesina et al. 2003, the diversity index calculated by Fearon 2003, and the one provided by Ethnologue (Grimes 2005), obtaining even less significant results.⁴

⁴ Other operationalizations of data and indices of ethnicity are discussed by Cederman and Girardi (2007).

Table 5. Institutional and heterogeneity measurements

	lnS	lnA	lnPop	lnR	lnM
Agriculture (percentage of active population)					
Coefficient	-0.018	0.156	-0.494	0.027	-0.035
Adjusted R ²	0.017	0.002	0.004	0.026	0.027
p-value	0.156	0.716	0.387	0.107	0.103
Foreign trade (percentage of GDP)					
Coefficient	-0.008	-8.623	-10.68	-0.009	0.003
Adjusted R ²	0.158	0.233	0.241	0.168	-0.004
p-value	0.000	0.000	0.000	0.000	0.405
Ethnicity index					
Coefficient	-0.658	0.804	-0.427	0.345	-0.072
Adjusted R ²	0.007	-0.01	-0.011	-0.008	-0.012
p-value	0.218	0.631	0.743	0.550	0.927

Data sources:

Percentage of active population employed in agriculture for 64 democratic countries with available data, and Foreign trade as a percentage of GDP for 72 countries with available data, from World Bank Development Indicator. Ethnicity index for 82 democratic countries from Alesina et al. (2003).

One problem with the available measurements of cultural heterogeneity may be that they are calculated at the country level and do not capture the dispersion or concentration of the population, which can be more relevant to explaining problems of governance. It can be presumed that over a long term, people of similar race, sharing a common language or with close preferences on religion tend to live near to one another. Relatively low levels of cultural heterogeneity can also be the result of endogenous formation of preferences within a community, since sustained conviviality promotes greater uniformity of cultural tools, beliefs and values (or ‘exit’ to communities with more similar or easier preferences to which to adapt). Then, within a large country, an institutional structure based on multiple territorial governments can help relatively homogeneous small communities to live in peace and good governance, even if the country as a whole is highly heterogeneous in cultural terms as measured by the available indices. Conversely, considerable problems for governance can be correlated with high levels of heterogeneity of the population living in relatively small communities, which may not be linearly dependent on the heterogeneity of the country taken as a whole.⁵

⁵ There has been some recent discussion about the importance of local heterogeneity. In particular, some recent studies of civil wars suggest that conflicts and violence within countries are significantly related to large country size in terms of population, as well as to state weakness and political instability, but not so much to ethnic or religious diversity as measured at country level (Collier 2000; Reynal-Querol 2002; Fearon and Laitin 2003).

Attempts to measure local heterogeneity include the Minorities at Risk Project (2009), but the manageable values are available for only a limited number of “minorities” considered as being “at risk of rebellion, protest, or repression”, not for all cultural (race, religious and language) groups in democratic countries, and they are given as a simplified dichotomous classification.

In the absence of sufficient local or micro-level data, I explored the potential usefulness of taking into account a variable as simple as the population density of the country (that is, the quotient between population and area). Let us briefly consider the polar cases to give ground to a hypothesis concerning its potential effects. Low density usually implies territorial dispersion of the population in several distant or separate groups. Even if the country’s population as a whole is relatively homogeneous, the costs of governance related to physical distance might make federalism an advisable formula for a durable democracy. Australia, for one, would be an example of this. If, in addition, the country’s population taken as a whole is very heterogeneous, it is likely that the population may be disperse in different groups with relatively high degrees of internal homogeneity, as argued above and as largely happens, for instance, in Canada. Non-ideologically, territorial governments could then be based on relatively homogeneous communities. Federalism might then be appropriate formulas for good governance and durable democracy in countries with this type of structure, that is, with low density of the population.

On the other pole, high population density is likely to imply local heterogeneity, whether in economic terms, as high density is usually related to high degrees of urbanization and diversification of economic activity, or in cultural terms, which may be produced by recent migrations. With this type of structure, federalism may not be a suitable solution since the creation of small territorial governments would not reduce much the complexity of the communities, while proportional representation might be more adapted to the formation of multiple, non-territorially based political parties able to represent different interests and values within a mixed population. (See related discussion in Mozaffar, Scarritt and Galaich 2003; Brambor, Clark and Golder 2007.)

A simple test shows that, among durable democracies, the values of population density for countries with alternative institutional formulas differ in the expected direction. Specifically, the average population density of democratic countries, as given by number of inhabitants per square kilometer, is 126 for countries with $R > 1$ and 175 for those with $R = 1$. For the electoral system, the differences are, also as expected, in the opposite direction, but they are more modest: 166 for the countries with $M > 1$ and 155 for those with $M = 1$ (while the same direction holds for subsets: among the countries with $R > 1$, 129 for those with $M > 1$ and 119 for those with $M = 1$; among the countries with $R = 1$, 186 for $M > 1$ and 169 for $M = 1$).⁶ Federal countries have more dispersed populations than unitary ones, while countries with proportional representation have

⁶ These calculations exclude the outlier Botswana, whose value of density has four figures, in contrast to the range of values for all the other countries which have between one and three figures; its inclusion does not change, however, the direction of the relationships just reported.

higher population densities than those using majority electoral rules. While the suggestion to take country-wide population density as an index of local heterogeneity might be exploited in further research, I think, however, that at this preliminary stage it does not offer sufficiently different quantitative values to be worth including in the basic model presented above.

Colonial legacy. It is common knowledge that single-seat electoral districts with plurality rule was a usual institutional legacy in former British colonial dominions (single-seat districts with majority rule runoff could be a French colonial legacy too, but there are very few cases with this in the past among current durable democracies). A cursory inspection of the 26 former British colonies within our set of countries shows, however, that a number of them have escaped from the traditional British institutional model. The larger of these countries, while keeping single-seat districts ($M=1$), have adopted a federal structure ($R>1$), which, as mentioned, is the most effective mechanism to deal with governance in a large country (they include Australia, Canada, India, the United States, and, more recently, even partial decentralization in the United Kingdom). Others of middle size have adopted multimember districts with proportional representation rules ($M>1$) (Cyprus, Guyana, Malta, Mauritius, New Zealand, Tuvalu) or both $R>1$ and $M>1$ (South Africa). The remaining 14 former British colonies with $R=1$ and $M=1$ are very small countries in terms of population (excepting only Botswana and Ghana).

In the past, a number of former British colonies in Africa and Asia having adopted the colonial metropolis' formula (implying $R=1$ and $M=1$) for their first democratic experience failed, especially in countries with high ethnic diversity or relatively large size. But among the current durable democracies in former British colonies, although a few large countries maintain single-seat districts, the size variable is sufficiently descriptive to sustain the correlation with the institutional alternatives. The subsequent regression including the condition of former British colony as a factor for $M=1$ is not statistically significant.

Old and recent democracies. Finally, I have considered whether relatively old and new democracies may have adopted different alternative institutions. An apparently reasonable hypothesis might be that old democracies may have nowadays institutional regimes that are more apt at dealing with the problems of governance derived from size and social complexity than recent democracies because they tend to adjust to social and political changes by means of periodical institutional renewals and actors' adaptations. This hypothesis might be supported by major institutional reforms in favor of creating territorial governments in large, previously unitary European states, including Italy, France and partially the United Kingdom, as well as some electoral reforms moving away from single-seat districts to electoral systems with $M>1$, such as in Japan and New Zealand.

Alternatively, it can be postulated that recent democracies have learned from previous experiences (and perhaps the advice of political scientists and alike) to adopt institutional alternatives better suited to their size and the associated problems of

governance than older democratic experiences. The fact that among the new democracies established in countries with more than one million inhabitants since the 1970s there is almost no case in which the old British model involving $R=1$ and $M=1$ has been adopted might support this alternative hypothesis.

The results of the ensuing empirical test provide strong support to the model based on country sizes. I have re-run the basic multivariate linear regression between S , R and M for the set of 27 countries with current ‘old’ democracies established before 1974 and for the set of 55 countries with ‘recent’ democratic regimes. The results are statistically highly significant for both. But the coefficients are different. For the old democracies, R is much more important than M in explaining the variation in the sizes of the countries. For the more recent democracies, both R and M have similar weights. Looking at the sizes of the countries in the two sets, we note the recent proliferation of medium-sized and small countries. The old democracies have a median population equal to 74 million inhabitants and a mean $S=251$, while the recent ones have a median population of 13 million and a mean $S=132$. The differences in the choice of institutional alternatives between the two sets of old and recent democracies can, therefore, be largely explained by the different sizes of the countries involved. A large number of the old democracies that have been able to survive were established in relatively large countries with federalism ($R>1$), whether with proportional rules or single-seat electoral districts ($M>1$ or $M=1$), as well as in some medium-sized countries with a unitary structure and proportional representation ($R=1$ and $M>1$). By contrast, most of the more recent democracies have been established in medium-size countries with proportional representation ($M>1$), whether with federal or unitary structure ($R>1$ or $R=1$), as well as in a number of new small countries with simple institutional formulas ($R=1$ and $M=1$), but no case has involved $R>1$ and $M=1$, in contrast to large countries in the first period.⁷

5. Explaining and predicting choices of institutions

The main result of the analysis in this paper is equation (2b):

$$S = 62 \sqrt{R \sqrt{M}}$$

which accounts for about half of the variation of the operationalized values of assembly size, federalism and the electoral system in durable democratic countries. The equation is valid for two-thirds of the countries (55 out of 82 cases) within a factor of two.⁸

⁷ The subsequent regressions are, for the 27 countries with current democracy established before 1974: $\ln S = 5.0 + 0.44 \ln R + 0.1 \ln M$ ($R^2: 0.47$, p-value: 0.000).

For the 55 countries with current democracy established since 1974:

$\ln S = 3.9 + 0.39 \ln R + 0.35 \ln M$ ($R^2: 0.45$, p-value: 0.000).

⁸ Since this is a multiplicative function, giving the error ranges as a multiplication can be equivalent to giving the error as a sum +/- of some value for an additive function. For previous applications and discussion of this criteria, see especially Taagepera (2008).

To see how to analyze the fit of the equation for each country, let us discuss a few examples. As we will see, the quantitative trade-offs implied by equation (2b) can produce multiple institutional combinations in equilibrium.

An illustrative case of a large country with $R > 1$ and $M > 1$ may be Italy, whose values are $S = 630$, $R = 20$, and $M = 24.2$. According to equation (2b), the expected value of S should be equal to $62 \cdot (20)^{1/2} \cdot (24.2)^{1/4} = 63 \cdot 4.5 \cdot 2.2 = 615$, pretty close to the actual value of 630. Actually, the Italian lower chamber is oversized regarding the country's population and the cube root law mentioned above. But according to the analysis here presented, the large size of the assembly (that is, the high value of S) is consistent with the option for having both a decentralized regional structure and a proportional representation electoral system (that is, high values of both R and M).

Alternatively, a large country can work consistently with $R > 1$ and $M = 1$, as we discussed in section 3. In the case of the United States, the values are $S = 435$, $R = 50$, and $M = 1$. According to equation (2b), the expected value of S should be equal to $62 \cdot (50)^{1/2} \cdot (1)^{1/4} = 62 \cdot 7.1 \cdot 1 = 438$, very close to the actual value of 435. The United States has the maximum value of R and the minimum value of M . The very high number of 50 states somehow compensates for the smallness of single-seat districts to make a satisfactory fit among the three institutional variables.

Consistently, in this case we find for S a deviation in the opposite direction, since the U.S. House of Representatives is undersized regarding the country's population and the cube root law. During the nineteenth century, the size of the House was regularly increased to account for population growth, but in spite of the increase in the country's population it has remained frozen since it was fixed at 435 seats in 1911. At that moment this was an almost exact fit with the cube root of the population. At about the same time the borders were fixed and 48 states had been admitted to the Union.

Subsequently, certain additional processes not included in the simple model presented in this paper may have helped institutions to work relatively smoothly, in spite of the population increase. In particular, internal migrations and periodical redistricting tended to reduce the heterogeneity of the population in each state and in each electoral district, respectively, making the election of representatives with broad support at those levels relatively easier. (For recent defenses of redistricting for good democratic performance, see Buchler 2007; Brunell 2008). Also primary elections permit the inclusion of people from varied groups and with different values within a few broad political parties. These additional mechanisms have become more relevant since the mid- or late-twentieth century, as the country's population increased. Nevertheless, proposals to increase the number of seats in the House to the cube root of the population have also been raised (for review and discussion, see Ladewig and Jasinski 2008).

The two examples of Italy and the United States suggest that for large countries some deviations of S values from the cube root of the country's population can be explained for consistency with actual choices regarding institutions such as R and M . If the latter imply high levels of territorial and political party pluralism, as in Italy, possibly due to multiple and diverse group pressures across the country and institutional choosers' wish to embrace faithful representation of the variety of the population, the

general assembly must be sufficiently large to capture that pluralism. If, in contrast, constitution-makers privileged the representation of varied territories, but were wary of the perils of multipartism when they chose the electoral institutions (or just imported them from the colonial metropolis before new rules of proportional representation had been invented), like in the United States, then the size of the federal assembly can remain relatively small. For each country size there can be therefore multiple equilibrium sets of institutions, but each of the sets involving different combinations of institutional alternatives will be in equilibrium if it is consistent with the quantitative trade-offs between institutions identified above.

Following a Riker's suggestion, we can also try to use "the byproducts of the scientific investigation to assess the value of reforms proposed to remedy instability" (Riker 1987: 115). Specifically, the asymmetric trade-off between federalism and proportional representation can cast light on the outcome of recent attempts at electoral reforms. Several initiatives to introduce proportional representation rules failed in federal countries, mainly in Canada and the United States, while successful reforms in the same direction took place in unitary countries, like Japan and New Zealand (for a review of these cases, see Blais 2008). According to the above-stated trade-off, federalism may thwart proportional representation in well-established democracies, while a unitary structure may leave more room for electoral reform.

Most of the lack of fit of equation (2b) is with small countries having 'too low' values of S . As had already been noted by Rein Taagepera in his seminal presentation of the cube root law, countries whose populations are less than one million and small-island nations tend to have smaller assemblies than expected (see the updated review and discussion in Taagepera 2007: 188-190). This might reflect the relatively lesser role of those assemblies as the viability of these countries is usually dependent on membership in larger alliances or unions, in a similar way as also regional and local assemblies fall short of the cube root law, as suggested at the beginning of this paper. But this is a subject deserving further discussion. If small countries are dropped from the sample, for the countries with more than one million inhabitants in our set of durable democracies the fit of the model as given by equation (2b) increases to 83% (44 out of 54 countries).

In the opposite direction, there are a few countries whose quantitative institutional values do not fit our model because they have 'too low' values of M or R in comparison to their values of S (and also in comparison to the cube root of the population). These are the following. Ghana, which experienced several shifts between democracy and non-democracy in the 1960s and 1970s, soon after independence, keeps plurality rule in single-seat districts, the British colonial legacy.

Mali, a former French colony, has used single-seat districts with majority rule runoff, like its former colonial metropolis. Recent developments have shown the fragility of this institutional framework. For Mali's second democratic election in 1997, an agreement between the government and the opposition introduced proportional representation rules, but it was declared unconstitutional by the judiciary; the subsequent election was annulled, a second call was boycotted by the main opposition parties, and a majority runoff was used again for the elections since 2002. Yet in 2012

an anti-democratic military putsch was enforced while a northern region declared secession.

Greece recently uses a small M as the result of its politicians holding the world record for continuous manipulation of the electoral system, while its party system has been shaken. Japan and South Korea also have small M, in spite of having recently adopted mixed electoral systems of single-seat districts and proportional representation; as these followed periods with majoritarian formulas, they may have been just an intermediate step towards increasing proportional rules. Japan, in addition, is the largest democratic country in the world with a unitary structure, certainly supported by the compact ethnic homogeneity of its population. Finally, Romania, which is the largest country within the European Union that has not adopted a decentralized structure, is also suffering some institutional stress.

The case of greatest misfit for the model is the United Kingdom, one of the oldest democracies in the modern world, which involves both low values of M and R and an extremely high value of S. The British House of Commons, which is the largest assembly of all democratic countries ($S=659$), has maintained almost the same size as the so-called Imperial Parliament established in the early nineteenth century (actually following the pattern of its predecessors the parliaments of Britain and of England), apparently to give room to a complex set of representatives from counties, boroughs, towns, universities and other types of districts. Since the late 1990s the United Kingdom implemented limited decentralization, that is, an increase of R, with devolution to Scotland, Wales and Northern Ireland. It was initially planned that nine English regions would also be formed, but the project was abandoned after the failure of the first referendum in North East England in 2004. At about the same time, an attempt at electoral reform which would have increased the value of M was launched, but it attained some success only for chambers other than the House of Commons (including for the European Parliament). In the United Kingdom, the federal-proportional trade-off may have limited the complete development of both reforms simultaneously and stopped the two initiatives mid-way. More recently, a formal proposal to reduce the size of the House of Commons was included in the government's program for institutional reform in 2010.

In spite of its 'deviated' set of institutional combinations, the United Kingdom seems to have a solid democracy –certainly supported by additional factors not captured by our simple institutional model. The other countries just reviewed, in contrast, have poorer democracy scores than the average (1.88, in contrast to 1.43 for the remaining countries in the set, according to Freedom House ten-year average scores). Within the set of the durable democracies, Ghana, Mali, Greece, Japan, South Korea and Romania seem to be among most likely candidates either for major institutional reform or further democratic deterioration.

6. Concluding Comments

In this paper I have discussed the configuration of equilibrium democratic institutions in countries of different sizes. Quantifiable trade-offs between different institutional alternatives have been identified. Specifically, in small countries, a unitary structure with elections in single-seat districts and a small assembly can be sufficient to identify majority preferences and enforce collective decisions. This is the case in almost all mini- and micro-states with less than one million inhabitants. In contrast, in medium-sized countries, a democratic regime may rely upon proportional representation of multiple parties to obtain greater endogenous support. In fact proportional representation began to be adopted for parliamentary elections in the early twentieth century in a few medium-sized European countries, such as Belgium, Finland, Norway and Sweden, soon followed by Austria, Denmark, Ireland and Switzerland, and has spread widely among new democracies in medium-sized countries across the world in recent decades. A most relevant finding is that the larger the country, the more important federalism is in establishing an equilibrium institutional framework, to the point of being compatible with diverse electoral systems for the lower chamber. Large federal countries include, for instance, proportional Argentina, Brazil, Germany and South Africa, as well as majoritarian Australia, Canada, India and the United States.

A quantitative logical model has specified the greater positive effect of a large number of territorial units in comparison with the effect of a sizeable electoral district magnitude as the country size increases. Regarding Riker's assumption that "the status-quo of one set of rules can be supplanted with another set of rules", we find that indeed all the institutional variables, including the size of the assembly, are manipulable to some extent. For each country there can be, thus, several equilibrium sets of institutions, but all in accordance with the trade-offs between institutions mentioned above.

The model accounts for about half of the variation of the operationalized institutional variables in durable democratic countries. Equation (2b) establishing quantitative measurements and relationships among the basic institutional variables for assembly size, territorial structure and the electoral system produces a satisfactory statistical fit for two-thirds of the current democratic countries (and more than fourth fifths of those with more than one million inhabitants).

The model presented in this paper can provide a parsimonious and consistent explanation of the variety of combinations of some basic institutional alternatives in durable democratic countries. In future research, additional variables could be added to refine the model, especially for cultural heterogeneity of the population, as appropriate data and operationalization became available, as well as for other institutional mechanisms, especially for separation of powers between presidents and assemblies. The model should provide predictive capacity able to support forecasts and practical advice. An efficient, attuned institutional design can be crucial, in particular, for the success of attempts at state- and nation-building in former colonial and non-democratic territories of different sizes.

References

- ACE Project (2009) Available at <http://aceproject.org>
- Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., & Wacziarg, R. (2003). Fractionalization, *Journal of Economic Growth*, 8, 2: 155–94.
- Balinski, M., & Young, H. P. [1982] (2001). *Fair representation*. Washington DC: Brookings Institution Press.
- Blais, A. (Ed.) (2008). *To keep or to change first past the post? The politics of electoral reform*. Oxford-New York: Oxford University Press.
- Boix, C. (1999). Setting the rules of the game: The choice of electoral systems in advanced democracies. *American Political Science Review*, 93: 609-24.
- Brambor, T., Clark, W. R., & Golder, M. (2007). Are African party systems different?, *Electoral Studies*, 26, 2: 315-323.
- Brunell, T. L. (2008). *Redistricting and representation: Why competitive elections are bad for America*. New York: Routledge.
- Buchler, J. (2007). The statistical properties of competitive districts: What the central limit theorem can teach us about election reform, *PS: Political Science and Politics*, April: 333-337.
- Cederman, L-E., & Girardin, L. (2007). Beyond fractionalization: Mapping ethnicity onto nationalist insurgencies, *American Political Science Review*, 101, 1: 173-185.
- Collier, P. (2000). Ethnicity, politics and economic performance, *Economics and Politics*, 12, 3.
- Colomer, J. M. (2001a). Disequilibrium institutions and pluralist democracy, *Journal of Theoretical Politics*, 13, 3, 2001: 235-248.
- Colomer, J. M. (2001b). *Political institutions: Democracy and social choice*. Oxford New York: Oxford University Press.
- Colomer, J. M. (2005a). It's the parties that choose electoral systems (or Duverger's laws upside down), *Political Studies*, 53, 1: 1-21.
- Colomer, J. M. (2012). The more parties, the greater policy stability, *European Political Science*, 11: 229-243.
- Cox, G. W. (1997). *Making votes count*. Cambridge: Cambridge University Press.
- Election Guide. 2009. Available at <http://www.electionguide.org/>
- Ethnologue: Languages of the world* (Grimes, B. E., Ed.). (2005). Dallas: Summer Institute of Linguistics (partly available at www.sil.org/ethnologue, Raymond G. Gordon, Jr. ed.).
- Fearon, J. D. (2003). Ethnic and cultural diversity by country, *Journal of Economic Growth*, 8, 2: 195–222.
- Fearon, J. D., & Laitin, D. (2003). Ethnicity, insurgency, and civil war, *American Political Science Review*, 97: 75-90.
- Freedom House. (2011). *Freedom in the world: The annual survey of political rights and civil liberties* (Gastil, R. D. & Karatnycky A. Eds.). New Brunswick: Transaction (available at www.freedomhouse.org).
- Hix, S., Noury, A. G., & Roland, G. (2007). *Democratic politics in the European*

- Union. Cambridge: Cambridge University Press.
- Inter-Parliamentary Union. Parline Database. (2009). Available at <http://www.ipu.org>
- Kochen, M., & Deutsch, K. W. (1969). Toward a rational theory of decentralization, *American Political Science Review*, 63: 734-749.
- Ladewig, J. W., & Jasinski, M. P. (2008). On the causes and consequences of and remedies for interstate malapportionment of the U.S. House of Representatives, *Perspectives on Politics*, 6, 1: 89-107-
- Lijphart, A. (1999). *Patterns of democracy*. New Haven: Yale University Press.
- Minorities at Risk Project. (2009). University of Maryland at College Park. Available at <http://www.cidcm.umd.edu/mar>
- Mozaffar, S., Scarritt, J. R., & Galaich, G. (2003). Electoral institutions, ethnopolitical cleavages and party systems in Africa's emerging democracies, *American Political Science Review*, 97, 379-390.
- North, D. C. (1990). *Institutions, institutional change, and economic performance*. New York and Cambridge: Cambridge University Press.
- North, D. C., & Thomas, R. P. (1973). *The rise of the Western world: A new economic history*. New York and Cambridge: Cambridge University Press.
- Pierson, P. (2000). Increasing returns, path dependence, and the study of politics, *American Political Science Review*, 94, 2: 251-268.
- Polity IV Project. (2009). Available at <http://www.systemicpeace.org/polity/polity4.htm>
- Powell, G. B. (1982). *Contemporary democracies*. Cambridge, MA: Harvard University Press.
- Reynal-Querol, M. (2002). Ethnicity, political systems and civil wars, *Journal of Conflict Resolution*, 46, 1: 29-54.
- Richardson, L. F. [1949] (1960). *Arms and insecurity: A ,athematical study of the causes and origins of war*. Pittsburgh: Boxwood Press, 1960.
- Riker, W. H. (1980). Implications from the disequilibrium of majority rule for the study of institutions, *American Political Science Review*, 74: 432-446.
- Riker, W. H. (1982). *Liberalism against populism: A confrontation between the theory of democracy and the theory of social choice*. San Francisco: Freeman.
- Riker, W. H. (1987). *The development of American federalism*. Boston: Kluwer.
- Riker, W. H. (1996). European federalism: The lessons of past experience, in Hesse, J. J., & Wright, V. (Eds.). *Federalizing Europe? The costs, benefits, and preconditions of federal political systems*. Oxford: Oxford University Press.
- Shugart, M. S., & Carey, J. M. (1992). *Presidents and assemblies: Constitutional design and electoral dynamics*. New York: Cambridge University Press.
- Shepsle, K. (1979). Institutional arrangements and equilibrium in multidimensional voting models, *American Journal of Political Science*, 23: 27-59.
- Shepsle, K. (1986). Institutional equilibrium and equilibrium institutions, in *Political science: The science of politics*, ed. Herbert Weisberg. New York: Agathon: 51-81.
- Shepsle, K. (1989). Studying institutions: Some lessons from the rational choice approach, *Journal of Theoretical Politics*, 1: 131-149.
- Stepan, A. (1999). Federalism and democracy: Beyond the U.S. model, *Journal of*

- Democracy*, 10, 2: 12-26.
- Taagepera, R. (2007). *Predicting party sizes: The logic of simple electoral systems*. Oxford and New York: Oxford University Press.
- Taagepera, R. (2008). *Making social sciences more scientific. The need for predictive models*. Oxford: Oxford University Press.
- Taagepera, R. (Ed.), Coleman, S., Colomer, J. M., & Grofman, B. (2007). Why political science is not scientific enough: A symposium, *European Political Science*, 6: 111-113.
- Taagepera, R., & Shugart, M. S. (1989). *Seats and votes. The effects and determinants of electoral systems*. New Haven, CT-London: Yale University Press.
- The World Factbook. (2009). Available at <https://www.cia.gov/library/publications/the-world-factbook>
- Weaver, R. K. (2002). Electoral rules and governability, *Journal of Democracy*, 13, 2: 111-125.